

Daljinska detekcija i računarska obrada slike

Sadržaj

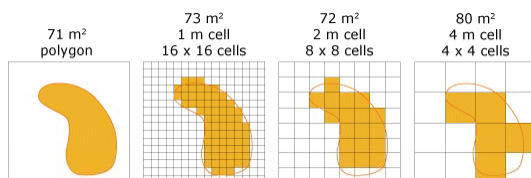
- GIS model podataka
- Šta je raster?
- Rasterski slojevi
- Veličina ćelija rasterskih podataka
- Representing features in a raster dataset
- Discrete and continuous data
- Rasterski model podataka
- Zapis rasterskog formata
- Optimizacija u smeštanju, indeksne strukture, Streaming i piramidalne strukture
- Osnove procesiranja snimaka – algoritmi i transformacije
- Uvod u daljinsku detekciju
- Karakteristike elektromagnetskog zračenja
- Izvori energije i principi radijacije
- Spektralna refleksija
- Senzori i platforme

Cell size of raster data

- The level of detail (of features/phenomena) represented by a raster is often dependent on the cell size, or spatial resolution, of the raster.
- The cell must be small enough to capture the required detail but large enough so computer storage and analysis can be performed efficiently.

Cell size of raster data

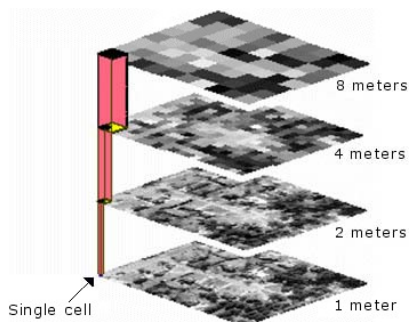
- More features, smaller features, or a greater detail in the extents of features can be represented by a raster with a smaller cell size.
- Smaller cell sizes result in larger raster datasets to represent an entire surface; therefore, there is a need for greater storage space, which often results in longer processing time.



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| <ul style="list-style-type: none"> • Smaller cell size • Higher resolution • Higher feature spatial accuracy • Slower display • Slower processing • Larger file size | <ul style="list-style-type: none"> • Larger cell size • Lower resolution • Lower feature spatial accuracy • Faster display • Faster processing • Smaller file size |
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Cell size of raster data

- Choosing an appropriate cell size is not always simple.
- You must balance your application's need for spatial resolution with practical requirements for quick display, processing time, and storage.



Cell size of raster data

- Determining an adequate cell size is just as important in your GIS application planning stages as determining what datasets to obtain.
- A raster dataset can always be resampled to have a larger cell size; however, you will not obtain any greater detail by resampling your raster to have a smaller cell size.

Cell size of raster data

- The following factors should be considered when specifying the cell size:
 - The spatial resolution of the input data
 - The application and analysis that is to be performed
 - The size of the resultant database compared to disk capacity
 - The desired response time

Types of resolution

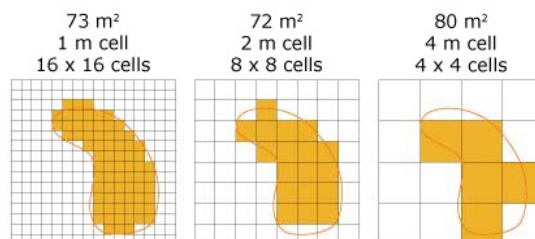
- When working with imaged raster data, there are four types of resolution you may be concerned with:
 - spatial resolution,
 - spectral resolution,
 - temporal resolution and
 - radiometric resolution.

Types of resolution

- In a GIS, you are most often concerned with the spatial resolution of a raster dataset, especially when displaying or comparing raster data with other data types, such as vector.
- In this case, resolution refers to the cell size (the area covered on the ground and represented by a single cell).

Types of resolution

- A higher spatial resolution implies that there are more pixels per unit area; therefore, the graphic on the left represents a higher spatial resolution than the graphic on the right.



Types of resolution

- **Spectral resolution** describes the ability of a sensor to distinguish between wavelength intervals in the electromagnetic spectrum.
- The higher the spectral resolution, the narrower the wavelength range for a particular band.
- Advanced multispectral and hyperspectral sensors collect data from up to hundreds of very narrow spectral bands throughout portions of the electromagnetic spectrum, resulting in data that has a very high spectral resolution.

Types of resolution

- **Temporal resolution** refers to the frequency in which images can be captured over the same place on the earth's surface, otherwise known as the revisit period, which is a term most often used when referring to satellite sensors.
- Therefore, a sensor that captures data once every week has a higher temporal resolution than one that captures data once a month.

Types of resolution

- **Radiometric resolution** describes the ability of a sensor to distinguish objects viewed in the same part of the electromagnetic spectrum; this is synonymous with the number of possible data values in each band.
- For example, a Landsat band is typically 8-bit data, and an IKONOS band is typically 11-bit data; therefore, the IKONOS data has a higher radiometric resolution.

Spatial resolution versus scale

- Spatial resolution refers to the dimension of the cell size representing the area covered on the ground.
- Therefore, if the area covered by a cell is 5 x 5 meters, then the resolution is 5 meters.
- The higher the resolution of a raster, the smaller the cell size and, thus, the greater the detail.
- This is the opposite of scale.
- The smaller the scale, the less detail shown.

Spatial resolution versus scale

- Below, the scale of the image on the left (1:50,000) is smaller than the scale of the image on the right (1:2,500); however, the spatial resolution (cell size) of the data is the same.



Scale 1:50,000
Cell size: 61 cm



Scale 1:2,500
Cell size: 61 cm

Spatial resolution versus scale

- Below, the spatial resolution of the data used in the image on the left is lower than the spatial resolution of the data used in the image on the right.
- This means the cell size of the data in the left image is larger than that of the data in the right image; however, the scale at which each is displayed is the same.



Scale 1:20,000
Cell size: 15 m



Scale 1:20,000
Cell size: 15.24 cm